

REMARKS

Claims 57-103 are pending in the present application.

In the office action mailed September 22, 2005 (the "Office Action"), the Examiner rejected claims 57, 58, 62-67, 70-74, 79-85, 89-95, and 99-103 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,751,929 to Hayakawa *et al.* (the "Hayakawa patent"). The Examiner further objected to claims 59-61, 68, 69, 75-78, 86-88, and 96-98 as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form.

The specification has been amended to conform the material found in the Summary of the present application to the language of claims 57-103.

Claim 57 has been amended to more clearly recite the subject matter being claimed. It will be apparent from the amendments, and the comments below, that the amendments to claim 57 were made independent of the cited references. None of previously mentioned amendments narrow or further limit the scope of the invention as recited by claim 57. Generally, the amendments make explicit what is implicit in the claim, add language that is inherent in the unamended claim, or merely redefine a claim term that is previously apparent from the description in the specification. Consequently, the amendments should not be construed as being "narrowing amendments," because these amendments were not made for a substantial reason related to patentability.

Claims 57, 64, 73, 83, and 93 are patentably distinct from the Hayakawa patent because the Hayakawa patent fails to disclose the combination of limitations recited by the respective claims.

The Hayakawa patent describes a Doppler ultrasound system for measuring and displaying blood flow velocity profiles and average blood flow velocity. The system includes an ultrasonic probe 1 coupled to transmit and receive circuits 3 and 5. Reflected ultrasound is detected by the probe 1, and the receive circuit 5 provides echo signals to a quadrature phase detector 6. As described in the Hayakawa patent, the phase detector 6, in conjunction with a reference signal generator 7, generates output signals Va and Vb that represent Doppler frequency shifts. The Doppler signals Va and Vb are then quantized by an ADC 8 to generate digital data representing the signals, which are interleaved to provide a multiplexed signal that is analyzed by the frequency analyzer 9.

In contrast to the Doppler ultrasound system described in the Hayakawa patent, claims 57 and 64 recite a Doppler ultrasound system and a Doppler data processing engine, respectively, where the echo signals are digitized *prior* to any Doppler shift processing. For example, with reference to claim 57, an ultrasound receiver is configured to detect echo signals resulting from emitted ultrasound signals, and an ADC coupled to the ultrasound receiver quantizes the *echo signals* into digital sample value. The digital sample values are provided to a processor coupled to the ADC to perform Doppler signal processing. With reference to claim 64, an ADC circuit is coupled to the ultrasound receiver to quantize *echo signals* received by the ultrasound receiver. As previously discussed with respect to the Hayakawa patent, the echo signals generated by the receiver 5 are first processed by the quadrature phase detector 6 to demodulate the signal into Doppler shift components represented by analog signals Va and Vb. The *demodulated Doppler signals* are then quantized by the ADC 8. Digitization in the ultrasound system described in the Hayakawa patent does not occur until *after* the echo signal is initially processed by the quadrature phase detector 6 and demodulated into the Va and Vb analog signals. By digitizing the raw echo signals, as recited in claims 57 and 64, Doppler processing can be preformed in the digital domain rather than in the analog domain, as described in the Hayakawa patent.

Claims 73, 83, and 93 are similarly patentably distinct from the Hayakawa patent because these claims recite quantization of the raw echo signals prior to performing any Doppler processing. For example, claim 73 recites a method where the detected echo signals for each pulse of ultrasound are quantized into digital sample values representing the echo signals. Processing is then performed on digital sample values to provide data representative of blood flow velocity. Claim 83 is directed to a method for providing blood flow information which similarly recites that the detected echo signals, which result from emitted ultrasound signals, are quantized to generate a plurality of digital sample values representing the echo signals. Doppler processing is performed on the digital sample values. Claim 93 recites a computer readable medium having computer executable instructions that include instructions for controlling an ADC to quantize detected ultrasound echo signals to generate a plurality of digital sample values representative of the ultrasound echo signals and instructions for performing Doppler processing on the digital sample values. As previously discussed with respect to claims 57 and 64, the

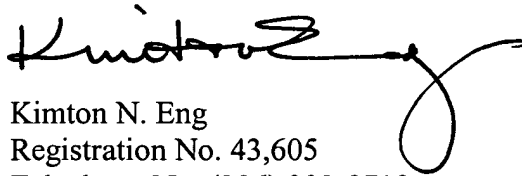
Doppler ultrasound system described in the Hayakawa patent performs A/D conversion on post-Doppler shift processed signals output by the quadrature phase detector 6, whereas in claims 73, 83, and 93, the raw echo signals are digitized and Doppler processing occurs in the digital domain.

For the foregoing reasons, claims 57, 64, 73, 83, and 93 are patentably distinct from the Hayakawa patent. Claims 58, 62, and 63, which depend from claim 57, claims 65-67 and 70-72, which depend from claim 64, claims 74 and 79-81, which depend from claim 73, claims 84, 85, 89-92, which depend from claim 83, and claims 94, 95, and 99-103, which depend from claim 93, are similarly patentably distinct from the Hayakawa patent based on their dependency from a respective allowable base claim. Therefore, the rejection of claims 57, 58, 62-67, 70-74, 79-85, 89-95, and 99-103 under 35 U.S.C. 102(b) should be withdrawn.

All of the claims pending in the present application are in condition for allowance. Favorable consideration and a timely Notice of Allowance are earnestly solicited.

Respectfully submitted,

DORSEY & WHITNEY LLP



Kimton N. Eng
Registration No. 43,605
Telephone No. (206) 903-8718

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Enclosures:

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DORSEY & WHITNEY LLP
1420 Fifth Avenue, Suite 3400
Seattle, WA 98101-4010
(206) 903-8800 (telephone)
(206) 903-8820 (fax)

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